

Reply To: 3420

Date: July 7, 1993

To: Forest Supervisor, Cleveland National Forest

Subject: Pest conditions in two Coulter pine plantations on the Palomar  
Ranger District (FPM Report No. S93-2)

On November 9, 1992, I visited two sites with Roger Wong, Resource Officer, Palomar Ranger District. These were (1) some damaged Coulter pines in a plantation on the Observatory grounds, and (2) a Coulter pine plantation above the Fry Creek Campground.

We first examined a young Coulter plantation on a slope west of the Palomar Mountain Observatory. This 8 year old plantation comprises approximately 15 acres and is surrounded by black oak, live oak, and Coulter pine. The symptoms on the Coulter pines were consistent with wind-driven hail. The stems were bruised and wounded on the upwind side, the needles were torn from the upwind side, and those left on the shoots were bent towards the downwind side. A check of the Observatory weather records indicated that there had been a severe hailstorm on August 13, and that such storms were common there in late summer. Old, partially callused injuries seen on some shoots were consistent with hailstorm damage from previous years.

The second Coulter plantation was located above the Fry Creek Campground at about 5300' elevation. The trees were planted in about 1981 on a 20 acre site which had previously supported grasses and forbs. In the summer of 1990, half of the plantation had been thinned. Slash was lopped, bucked in 18" lengths, and scattered. Trees had responded well to the thinning in terms of growth. However, mortality was high in both the thinned and the unthinned parts of the plantation, and appeared to have occurred in 1991 and 1992. Ips galleries and a few dead adults were found in some of the dead trees. The slash from the 1990 thinning was examined for bark beetle galleries, to see if the Ips might have built up in the slash and then moved to the green trees. No evidence of bark beetle infestation was found in the slash. It appeared that the tree mortality was the result of a microsite problem, particularly since the site had not supported trees in the past. It is also possible that the mortality was the result of tree to tree or grass to tree competition.

Management options for both of these sites include doing nothing or continuing to manage for optimal growth by thinning and removing competing vegetation as appropriate. Lopping, bucking up, and scattering the slash in the sun appears to have worked well in preventing a buildup of Ips. The best time of year to create slash is August to December. Slash created earlier in the year is likely to become infested with Ips before the phloem can dry out and become unsuitable as bark beetle food. However, slash which does not dry out prior to becoming covered with snow often remains succulent until the following spring, and can support a generation of bark beetles. In southern California, Ips

nts appear to be present at any time the weather is warm enough for them to  
fly.

Attached is a document concerning managing slash for the prevention of Ips  
buildup. Please call me at (909) 383-5588 if you have any further questions.

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cc: District Ranger, Palomar Ranger District  
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# PINE ENGRAVERS

## Complacency in slash treatment --

"The threat of outbreaks posed by insects breeding in residues is generally overrated. Graham (1922) and Craighead et al. (1927) long ago concluded that the insect menace posed by slash is more theoretical than real. Entomologists today generally agree. However, it is well to treat ips with respect for the pine engraver problem associated with the creation of slash is unpredictable. There are years when no trees are killed, despite suitable slash and lots of beetles. These same conditions in other years lead to unacceptable tree mortality. Therefore, it is best to follow recommended practices and not to grow complacent because one has 'lucked out' for a couple of years."

The critical factor appears to be the vigor of the residual green trees in late summer. There generally is no tree mortality when precipitation in April, May and June is normal or greater; an 'ips year' occurs when precipitation in those key months is below normal. That, at least, is what general correlations suggest." (Dolph 1971)

A question facing foresters is whether the beneficial aspects of engravers aiding in residue fragmentation outweigh the reasons for removing residues.

## SLASH TREATMENT

Broad statements are not possible. Considerations to be taken into account are 1) species of tree, 2) character of slash, 3) species of insect involved.

Concern: 1) Slash attracting insects from the surrounding forest and concentrating them in the vicinity of the slash, where they kill living trees; 2) slash supplying breeding material for insects which emerge and kill mature standing timber or seedlings, saplings and poles.

The main concern is slash from PINE, SPRUCE and DOUGLAS-FIR. The slash of fir, larch, redwood, hemlock, cypress, cedar and juniper either breeds insects of very little significance as tree killers, or the trees killed are so few or of so little value as to be of small economic importance.

## PINE

BEST	All lopped and exposed to sun. Only vertical limbs lopped. Unlopped.	< # of beetles produced
WORST	Lopped and piled.	> # of beetles produced

Worst time to create slash -- January to mid-July.

#### A. Prompt Slash Disposal

Dozer trampling (crushing); disking and trampling = chopping  
Chipping  
Plastic "Greenhouse"  
Lopping (limbing)  
Lop and scatter  
Burning  
Burying  
Removal

#### B. Prompt Slash Disposal Impractical

Where general slash disposal is impractical, scattering the slash into openings where it is exposed to direct sunlight dries it out faster, and dry slash is unsuitable for beetle development.

#### C. Green Chain Technique

A good pine engraver year is usually one in which:

- a. the winter is abnormally dry,
- b. warm weather lasts late into the fall and occurs early in the spring,
- c. spring rains are few with long periods between what rains occur.

#### MATERIAL USUALLY NOT PRODUCING LARGE BROODS:

1. Lopped material less than 3 inches diameter
2. Very large logs
3. Material with bark > 1 in in thickness is seldom attacked (excluding unlopped tree tops).
4. Old, soured or partially dry slash. (The objective of slash disposal treatments is to create this type of slash before infestation).
5. Thinning slash is not particularly good breeding material, but it is often densely attacked. This aggregation of beetles can result in tree killing when the recent problems of severe competition and the shock of sudden exposure to full sunlight are compounded by drought.
6. Trees treated with silvicide and slash therefrom.

#### MATERIAL CONDUCIVE TO THE DEVELOPMENT OF LARGE BROODS OF ENGRAVERS.

1. Most productive -- stem portions of unlopped tree tops varying in basal diameter from 10-20 inches or more.
2. Piled green slash of any dimension.
3. Concentrations of freshly-cut slash on the ground in full or partial shade.
4. Unlopped tree tops and other slash and debris created from January through June.
5. Most important source of breeding material in logging slash is the main stem from about 3 inches and up.
6. The main stem of a top is potentially more dangerous than limbs, particularly if the limbs are severed.

7. Shading with miscellaneous logging debris will offset lopping and sunlight.
8. Slash 6 to 24 inches diameter cut after January 1.
9. Piled pine pulpwood or logs.
10. Pines girdled for understory release.
11. Branches and tops of pines broken off by snow.
12. Pines girdled by porcupines.
13. Suppressed pines.
14. Shaded slash and the underside of logs.

#### BEST MANAGEMENT PRACTICES.

Keep track of amount of slash laid down by windstorms

Check lightning struck trees whenever a fresh strike is seen.

When practical, cut young-growth pine after 7/15.

Lop and scatter all slash -- expose main stem to sun.

Utilize to minimum top diameter practicable.

Keep accumulations of slash or green logs away from living trees, and fell trees away from dense thickets of young-growth.

When necessary, kill broods by best means.

Prevent accumulation of felled material (avoid cutting practices, patterns, conducive to windthrow)

Alternate stand structure and species composition to reduce susceptibility.

Log infested and threatened stands -- 1st priority: stands with heavy populations and/or large volumes per acre.

Remove dead and infested trees from campgrounds before emergence.

Surveillance (monitoring) -- not treatment is necessary if there are few beetles.  
- reddish boring dust on upper surfaces and on ground under slash  
- Y, I, or H-shaped egg galleries; Y-shaped most common.  
- no pitch tubes

Salvage windthrows as soon as possible.

Residue treatments to minimize damage is most effective if applied before the thinning slash is attacked.

In high risk areas, such as campgrounds, use method(s) that prevent aggregation of many attacking beetles in proximity to residual trees.

Avoid trimming along power lines and other rights-of-way, running logging equipment over root systems of residual trees (designate skid trails), or other practices which may injure trees during periods of hot dry weather.

Destroy slabs from portable sawmills operating in forested areas.

Do not leave any ponderosa pine slash in a position that will prevent it from drying out quickly. When slash must be piled, plan to do it after mid-October, or treat by chipping or some other destructive method.

Intensive utilization and clean logging -- eliminate much of the slash and make it possible to more efficiently and effectively treat the slash in fuel and insect management.

Slash piled or bunched for burning or for wildlife habitat should be allowed to dry before the piling operation.

**AVOID THESE WORST MANAGEMENT PRACTICES:**

Piling fresh slash in any season without further treatment.

Letting slash or green logs accumulate near living trees.

Piling bucked limbs and cull logs along any forested roadside for fuelwood without prior treatment.

Windrowing fresh slash without drying (or partial drying).

Sporadic cutting in the spring of the year, with the slash unlopped and unscattered.

Removal of infested material to developed areas where emerging beetles can attack high value trees that may be stressed by improper site manipulations.

Piecemeal treatments -- measures to suppress beetle populations in thinning residues will minimize damage only if applied comprehensively on a regular basis.

Piling fresh slash adjacent to standing trees.

**Best recommendation:** Prevent stagnated or highly competitive growth conditions in stands.

**Brood Material --**

**Man-caused**

- pine logging slash
- pines damaged during logging of other trees
- fire-damaged pines
- pine pulpwood or log piles
- right-of-way clearing slash
- pines girdled for understory release

**Natural**

- trees weakened by other insects or other factors
- branches and tops of pines broken off by snow
- pines girdled by porcupines
- pines suppressed from competition
- diseased pines

Soils at field capacity at the beginning of the growing season will be nearly exhausted of moisture reserves by late July and early August if rainfall is below normal. Coincidentally, it is during this period that adult pine engravers are emerging at a fairly constant rate. However, moisture stress alone will not normally induce an outbreak. Stress must be coupled with brood material to provide the population increase necessary to produce tree killing.

Thinning after June 15: most available soil moisture is used and thinning will not provide any additional moisture for the residual stand. What you will get is increased soil temperatures and a higher evapo-transpiration stress.

Two situations which should be avoided at all seasons are piling fresh pine slash without further treatment, and allowing slash or green logs to accumulate near living trees.

California five-spined ips --

Beetles begin to emerge from spring-infested debris about the same time that trees first experience moisture stress and the result can be considerable tree mortality in nearby stands.

Even in areas where pines are few, pine slash can be heavily infested.

LITERATURE CITED

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